

# Critical Times

A q-0-monthly Newsletter

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## *An old concept, a new attitude*

It is sort of amazing that in a field so reliant on good communication, the various parties caring for patients in the ICU lack a recognizable forum for sharing information and ideas. Those who have been around a while remember the efforts of Eran Gellar and Anne Marie Solberg in producing a monthly newsletter. Unfortunately, their vision of collective education and understanding was not shared by a sufficient number of others to make the effort self-sustaining. The fate of the old newsletter is indeed sad, as our patients will never realize the greatest benefit from our knowledge and hard work if we fail to understand each other and the key patient care issues, and fail to share what we know.

Currently, we have energetic cooperation between multiple professions in daily bedside rounds, and all contributors seem to be on top of the latest developments in their respective fields. The level of technology and information processing at the VA is the envy of our many visitors, and according to the Stanford residents, is far superior to their EPIC system. Nonetheless, medical management and knowledge is constantly changing, and in order for new ideas and plans to actually make it to the bedside, there needs to be a mutual understanding amongst the principals involved. Take for example the case of tight

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glycemic control. A pretty simple concept: order an insulin drip and titrate to the desired level. But to achieve some fairly straightforward end-points, Juli Barr spent hours researching and gaining approval for protocols, considering contingencies, workflow and safety issues, and understanding the points of view of multiple professions through zillions of meetings. The fact we all need to recognize is that to get anything important done in the unit, cooperation between multiple professions is the universal rule. Unfortunately we lack a stable means for sharing new ideas, perfecting what we already are doing, and staying ahead of problems.

My observation is that everyone has some belief, bias, or understanding that they want to share with others. How many times have you heard: “if only so-and-so knew about XYZ, then they would not have done ABC...” This is the kind of stuff we need to hear about! The goal here is receive contributions from all people and professions that care for patients in the ICU. No contribution will be denied; however, those that deal with new information and ideas, controversies, and geriatric patients will be especially welcome. In the spirit of cooperation, Mellisa LaPierre, Sofya Morgan and I will share editorial oversight of the newsletter.

In this issue, ICU fellow, David Maslove provides an overview of “evidence based medicine” or EBM-- a conceptual framework for medical decision making that arises in many discussions on rounds. As he notes, EBM can either inform or confuse decision making, depending on the situation. One of our new fellows, Sunit Singh reviews the case for early physical therapy of ICU patients. Taking the evidence for early mobilization and the limitations of EBM together, these contributions challenge us to consider what is more appropriate: wait for more precise studies that describe our patient population, or “Just Do It?” To start off a series of communications from the Respiratory Therapy department, Brad Wee-Tom reminds us of the role of ventilatory alarms in patient monitoring, and of the responsibility we all share for patient assessment and safety. Finally, a primer on the the organization of Code Blue team is provided. So that's it for the inaugural issue! Publication will be every other month.

Thank you for readership and your contributions (yes, YOU!), and your interest in improving patient care in the ICU.

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## EARLY MOBILITY AND PHYSICAL THERAPY

by Sunit Singh MD

The focus of medicine in recent years has changed to promote early discharge of more functionally independent patient. Nowhere is it more applicable than the ICU. Patients are frequently de-conditioned during their ICU stay and left with contractures, and other functional disabilities for several years after hospital discharge<sup>1,2</sup>. With the decrease in ICU mortality through the years, there has been an increasing number of patients discharged from the ICU with these physical and neurophysiological disabilities<sup>3</sup>. The adverse effects of prolonged bed rest have been historically known<sup>4</sup> (Table 1). However deep sedation and immobility are still common in the ICU. Recent literature and studies have attempted to change this trend, and have shown that light sedation and early mobilization can have many short and long term beneficial effects.

### A Paradigm Shift – Decrease Sedation and Increase Mobilization

Immobility is associated with significant potential for harm<sup>3</sup>. Related is the issue of excessive sedation. This practice may have been necessitated by the early ventilators which required heavy sedation to maintain patient comfort and avoid dys-synchrony. However the disadvantages of this approach are numerous, namely – increased ICU delirium<sup>5</sup>, prolonged mechanical ventilation, and delayed discharge<sup>6</sup>. With the advent of more modern machines, patients with severe respiratory failure can be maintained in a lighter plane of sedation, with similar levels of comfort and safety. Ironically, ICU sedation protocols are coming a full

circle since the early days, when as Dr. Thomas Petty recalled “in 1964, patients who required mechanical ventilation [in our ICU] were awake and alert and often sitting in a chair eating food”<sup>7</sup>.

In 2008 Morris et al<sup>8</sup>, studied 330 MICU patients, and found that early ICU mobility was helpful in decreasing ICU stay and resulted in early hospital discharge. Moreover there was no difference in the cost between the control and the intervention group. Following this study, Schweickert in a randomized control trial published in Lancet (May 2009)<sup>9</sup>, showed that early physical therapy in mechanically ventilated patients was helpful in decreasing the duration of delirium, and decreased the number of days on the ventilator, resulting in early return to independent function. Both these studies are important from the perspective of challenging the current practice of considering physical therapy only after extubation.

Each year, more than 5 million Americans are discharged alive from the ICU<sup>10</sup>, and with aging this number is expected to grow exponentially<sup>11</sup>. Under such circumstances the emphasis should continue to be on discharging patients from the ICU, faster and with increased functionality than the ones discharged at present. Though the above mentioned studies have shown that early mobilization can be safely done, there is no framework or current guidelines on how to do it. Also as different patho-physiologies exist in the ICU, different strategies are required to suit the varied needs of patient. Complete bed rest is un-physiological, with certain exceptions, and should be questioned if a legitimate reason is not apparent. Therefore mobility protocols need to be initiated at the time of admission evaluated and updated

every day to customize to patient need<sup>12</sup>. Any mobilization will involve a thorough review of the medical background and detailed follow up to evaluate if the patient is tolerating the interventions<sup>13</sup>. Further, inclusion and exclusion criterion need be further investigated to make these protocols safe. Other barriers to ICU patient mobility include multiplicity of vascular access, obesity and time and cost restraints<sup>14</sup>. Thus, close teamwork involving the physician, nurses, nutritionist and physical therapist is quintessential to this approach. The increased time and manpower requirements of aggressive mobilization raises the question of whether we are appropriately staffed to achieve the what we all agree are benefits of early physical therapy in the ICU.

Though common sense and numerous publications have indicated the benefits from early mobilization, work needs to be done to change the mindset of ICU physicians and nurses alike. Similar situation exists in regards to sedation needs of patients. In a Canadian Survey<sup>15</sup>, only 40 % of physicians did daily interruptions of sedation in their ICU. A culture of increased mobility cannot be promoted with heavily sedated patients.

In Conclusion, I believe there is definite need for a change of culture. Further research is required in this field to answer the limiting questions and formulate specific guidelines that can be used on a widespread basis. Also data needs to be generated and evaluated regarding cost benefits of increased mobility, so that financial expectations of payers and regulators can be met. Ultimately this may be the final driving force for a paradigm shift to a more awake and mobile ICU patient!

## CONSEQUENCES OF PROLONGED IMMOBILITY

System	Complications
Respiratory	Atelectasis, Pneumonia, Pulmonary embolism
Cardiovascular	Hypovolemia, Dampened carotid baroreceptor response, orthostatic hypotension, DVT
Gastrointestinal	Constipation, Ileus, poor feeding
Renal	Renal calculi, urinary stasis
Endocrine	Hyperglycemia, insulin resistance
Musculoskeletal	Muscular atrophy and deconditioning, joint contractures, bone demineralization
Skin	Decubitus ulcers
Psychological	Depression, decreased functional capacity

### Have lines, will travel

*Foley, Swan, chest tube and drips are shown here on a CTS patient assisted by Eugene Plares. The patient was receiving at least three psychotropic medications for "agitation" at the start of the week... With a greater focus on physical mobilization, his medication needs changed, appetite and sleep improved, and he moved on, never to be seen again in the ICU.*



### Mobilizing Patients, practical issues:

Fred Tice, RN points out that it remains essential to make specific mobility requests in the nursing orders. Despite the greater presence of physical therapists in the unit, Dom Ronquillo emphasizes that if the PT orders are written incorrectly or are too restrictive, appropriate candidates might not receive the therapy. To obviate these concerns, we have worked with Nancy Clum from informatics to create an ICU specific order set for PT. All major language and verbiage has been carefully incorporated into items that can be checked off of a list.

To use the CPRS order set, log on and follow:

Orders > ICU > Consult Menu (on right)  
> PT Consult with activity. Once the order set opens, Fill in a Diagnosis and check a few additional boxes. > Done!

## WHAT IS "EVIDENCE-BASED MEDICINE?"

**David Maslove MD**

Over the last decade, the term Evidence Based Medicine (EBM) has come into widespread use in the field of medicine. In



medical school classes, hospital wards, and during bedside rounds, the concept of EBM has risen to the fore, and come to provide a new framework for clinical decision-making. But what do we really mean when we talk about evidence?

To some extent, medical decision-making has always relied on evidence, albeit of varying kinds. Data from laboratory experiments constitute one form of evidence, as does expert opinion, and even a single physician's own past experience. The quality of these kinds of evidence, however, is variable. Lab data suggesting that a treatment is effective may have come from experiments on rats, and thus have less relevance to humans. Experts may have strong views on what constitutes appropriate care, but personal beliefs, convictions, and even financial interests may bias these. One's own experience can be useful, but even the most seasoned clinician's recollections fail to constitute an objective and comprehensive source of information.

Most commonly, EBM refers to the evidence derived from large scale, scientifically designed human experiments. In the case of therapies, these most often come in the form of randomized controlled trials, in which a type of treatment given to one group of patients is compared with a second treatment given to another group similar to the first. If all else is remains equal between the two groups, then any differences seen in their outcomes can be attributed to the different treatments given. Mathematical tools can be used to determine the degree of certainty with which this assertion can be made. Similar experiments can be done to determine the value of diagnostic tests, preventive health strategies, and even different health administration policies.

In the ICU, the last ten years have given rise to an increase in the volume of high quality research studies intended to produce reliable clinical evidence. Nonetheless, few of these

have consistently yielded statistically significant results that show one form of treatment to be superior to others. Some examples of important evidence in the ICU include the use of low tidal volumes for patients with ARDS who are receiving mechanical ventilation, the use of early goal directed therapy for patients with septic shock, and the use of restrictive transfusion strategies for patients with low hemoglobin levels.

Everyday clinical decision-making is always informed by evidence. The evolving field of EBM had helped us to better estimate the quality of that evidence, and placed a premium on data derived from large-scale, well designed, prospective trials. These studies, such as the ones mentioned above, are useful in telling us what on average is likely to happen to the typical patient enrolled in the trial. Applying results to the individual patients, however, still requires careful consideration of the unique factors affecting their care. Even with the best evidence available we must always ask, "how will these results affect my patient?"

## **VENTILATOR ALARMS**

### **NOT A "SET IT AND FORGET IT!"**

**BRADFORD WEE TOM, RRT**

Ventilator alarms are an essential tool to safely manage our patients for years. However alarms are a direct reflection of the clinician just like our behavior, work ethics or co-worker interaction just to name a few. All too often we are consumed with the many new things that vents offer that I think alarms have lost their importance in the hierarchy. Everyone, and that includes all bedside staff is so accustomed to wanting to know the location and how to use the Alarm silence knob or button whenever an alarm occurs. Sadly, it seems that alarms regain their importance when either the volume is too loud or

annoying, going off constantly, or interfering with work.

The best practice to figure out why the alarm is sounding before silencing it:

1. Assess the patient's condition
2. Find out what is causing the problem:, is it the clinician, equipment or patient?
3. Assess whether the alarms are appropriate
4. Assess whether the patient can respond to the reason for the alarm

It is important that our reliance on new technology does not compromise our assessment and problem solving skills, or make them obsolete. There are guidelines for setting alarms, but this is no replacement for a clinician utilizing his or her assessment skills to determine what is appropriate for a given patient. If you think the alarm settings are not appropriate, definitely discuss with the responsible therapist the reason(s) why they chose those settings. If anything, more than likely everyone can and will learn from diverse educational interactions.

## ICU COMMUNICATION PROJECT

**Mellisa LaPierre, RN**  
**Sofya Morgan, RN**

We would like to spread the word about a project to be conducted over the next few months. This project will be focused on communication in the ICU with the goals of:

- } Analyze problematic areas of communication among MSICU providers in order to improve existing communication patterns. The aim is 100% MSICU nursing staff participation in response to questionnaires that will help target problem areas and create an inservice that addresses the issues.
- } Including MSICU House Staff participation in questionnaires to understand their issues.
- } The final goal of the project is to achieve a rating of "good" on the Likert scale for communication patterns by 90% of

questionnaire participants, nursing staff and residents, one year post communication inservice initiation.

We are in the process now of administering and collecting questionnaires from the nursing staff and the ICU house staff. Your thoughts, suggestions, and input into the project is very welcome and appreciated.

## CPR AND RESUSCITATION UPDATES FROM THE CPR COMMITTEE

**Decoding the Code Blue Team**  
**Geoff Lighthall, CPR Chair**

A number of studies have shown that markers of resuscitation quality (such as time to first shock, proper ventilation, and percent of time doing CPR) can be achieved with attention to team structure and team dynamics. With these concepts in mind, we have instituted a number of interventions to improve role clarity and training of our arrest team. Handouts and posters have been distributed to team members, and simulation training for code responders has expanded to up to four hours per month. When a patient arrests, the following should occur:

1. The first responder starts CPR and shouts for help
2. The second responder calls a code (or asks ward clerk to do so), brings in crash cart, attaches pads, turns on defibrillator, and helps with bag-mask ventilation.
3. The first and second responder may then switch roles if #1 becomes tired
4. If after about 2 min of compressions, if the code team has not yet arrived, the first responders should use the AED function of the defibrillator to administer a shock, if advised. If neither responder is comfortable with the AED, chest compressions should continue (and additional AED training should be requested).

5. Once the code team arrives, the interns should perform chest compressions and give each other breaks every two minutes.

Other code team members and roles:

6. Respiratory therapists--bag mask ventilate with SMALL, 500mL VOLUMES

7. Anesthesiologist--does airway exam, prepares to intubate

8. Crisis Nurse. Checks IV, places new one if needed and starts 1L of NS wide open.

Will administer drugs as requested. Should assure proper hookup of patient to defibrillator/ monitor, and should charge and discharge defibrillator when requested

9. Pharmacist. Should prepare 1mg EPI if chest compressions are being performed; draws up additional drugs if needed, keeps record.

10. Floor RN (if applicable) STICK AROUND, provide information regarding diagnoses, responses to therapy, recent meds, and allergies

11. ICU fellow. Helps leader if needed, otherwise, helps with procedures, helps figure out why patient coded, helps organize post-resuscitative care and communicates needs to ICU nurses.

12. Triage Attending (M-F 8:00-16:00) Fills in wherever needed. Helps resident/ fellow with running code and clarifying patient problem.

**12. The internal medicine resident runs the code and should observe and lead the various functions including:**

- a. the quality of CPR provided by interns
- b. the adequacy of ventilation, may need to have RT and anes. slow down or give smaller tidal volumes
- c. should advise anesthesiologist whether to intubate or not
- d. should advise pharmacist as to what drugs to have ready
- e. ask for defib charges/ shocks.

f. should have interns continue CPR while defib. charges, and have all clear for shocks.

g. should have CPR resumed regardless of result of shocks

h. should communicate which ACLS algorithm is applicable, and have someone else make get out card / cognitive aid and make sure the present resuscitative effort is following the protocol.

This rather detailed list of responsibilities can sound a bit overwhelming, but if everyone recognizes to his or her role, and both thinks about it and practices it regularly, performing well in a code can be incredibly straightforward.

Each month, the sim center staff and medical chief residents conduct a multi-hour course for code team members. If you are a pharmacist, RN or RT, you can drop in during one of the hours and practice your particular role, whether it is first responder, pharmacist or crisis RN. Call the Kam at the Sim Center at 63780 to sign up for one of these slots.

Course dates and additional information is posted on the VAPA CPR WEBSITE at: <http://sites.google.com/site/vapacpr/home>

In a typical code, only about a third of the people in the room are code team members. If you are not a direct participant in a code but still insist on going, please take in the whole picture and find something useful to do:

- check pulses
- make sure a backboard is being used
- bring a COW into the room and log on to the patient's chart
- throw away sharps
- throw a pile of gloves on the patient's bed
- move furniture out of the way
- reassure or help move neighbors
- get the notebook with recent vitals

- ask what ACLS situation is at hand. . .
- get out your card or cognitive aid, and offer to work with the leader to check the algorithm.

Where things go wrong is when people are not adhering to the basics of their job, or are trying to perform work that is not part of their routine practice. Emergencies are times to add your expertise to the overall effort, and NOT a time to learn something new.

## Cardiac Arrest Pearls

1. Most ward codes are either PEA or Asystole, and are un-monitored, unwitnessed arrests due to medical disease gone bad and surgical disease gone bad. Most arrests are preceded by abnormal vital signs that should trigger eTeam calls and other interventions.
2. VT/VF arrests are more common in CCUs and ICUs. If you have a monitored patient go into a VF/VT arrest, shock immediately.
3. If you find a patient pulseless, immediately launch into CPR. Even if the patient has a shockable rhythm, you will have a better chance of cardioversion if you do some CPR first. While doing CPR, hook up the pads.
4. If you come upon a patient receiving CPR, (and they indeed, have either PEA, asystole or VT/VF), they will ALWAYS need an IV and ALWAYS need EPI. So if you can place an IV, do it. If you know where the EPI is, get it ready..
5. Don't stress out about dialysis lines. If a patient is arresting, USE IT. Pull 10 mL of blood back (to remove anticoagulant) before hooking up to fluid line, but definitely use it!

## Check your BLS and ACLS Knowledge

1. **Exercise One:** Turn on a radio **really loud**. Now in one minute, write down the Five H's and Five T's. If you did not get 100%, go to the CPR website and download and print a set of ACLS cognitive aids. Carry them with you! Don't worry, you're not alone, but you also aren't as useful as you will be with some information that WILL GUARANTEE 10/10!

2. **Choose the incorrect response. The defibrillators present throughout the hospital**

- a) have AED functions
- b) can pace
- c) can give you a pulse ox signal
- d) are made by Zoll

e) can provide a continuous ECG trace

3. **If the defib pads don't work for some reason.**

1. Check connections from patient to defib unit
2. This is a common mode of machine failure; go to nearest ward and get another defib.
3. You still have two additional means of checking the rhythm, and one additional means to shock the patient.
4. Stop CPR, check for a pulse

- a) 1 & 3 are correct
- b) 2 and 4 are correct
- c) 1-3 are correct
- d) all are correct

4. **Regarding ventilation during CPR. . .**

1. Intubation is a huge priority, stop compressions as needed
  2. Can impair success of CPR in some cases
  3. Give large breaths to normalize acidosis
  4. Only experts should attempt tracheal intubation
- a) 1 & 3 are correct
  - b) 2 and 4 are correct
  - c) 1-3 are correct
  - d) all are correct

## Correct Answers and Notes:

1. *Take this seriously, 90% may get you an "A," but may leave 10% of your PEA patients dead!*
2. *D is wrong. Talk to a co-worker and make sure you understand why the others are right*
3. *A. Machine failure is incredibly rare. Make sure CPR continues while you work through machine & cable issues. If you follow the wires from the patient to the box, you will find the source of most errors. Connect the paddles to check rhythm, pace, and defib if needed. The ECG is monitored by the leads connected to the left side of the defib unit. The pulse OX can confirm pulsatile flow but not rhythm.*
4. *B. Big breaths can impair venous return and eliminate effectiveness of CPR. Despite A and B coming before C in "the ABCs," ventilation is not as important as CPR. In fact, a recent study showed better survival from out of hospital arrests when 200 chest compressions preceded ventilation. This approach will likely be advocated in the 2010 ACLS guidelines. If bag mask ventilation is ineffective, non-experts at tracheal intubation should place an LMAs rather than attempt laryngoscopy and intubation. Our code carts have #4 LMAs in the top drawer.*